

## CURRICULUM VITAE

NAME: Sondra Schlesinger

CITIZENSHIP: U.S.A.

FIELD OF SPECIALIZATION: Virology and Microbiology

### EDUCATION:

University of Michigan, Ann Arbor, MI  
University of Michigan, Ann Arbor, MI

B.S. 1956 Chemistry  
Ph.D. 1960 Biochemistry

### PROFESSIONAL EXPERIENCE:

Professor, Washington University School of Medicine, Department of Molecular Microbiology, St. Louis, MO	1977-2001
Visiting Scholar in the laboratory of Professor S.C. Harrison Harvard University, Cambridge, MA	1995-1996, 1989-1990
Associate Professor, Washington University School of Medicine Department of Molecular Microbiology, St. Louis, MO	1972-1977
Visiting Scientist, Imperial Cancer Research Fund Laboratories Department of RNA Tumor Virus Genetics & Viral Oncology, London, England	1974-1975
Assistant Professor, Washington University School of Medicine Department of Molecular Microbiology, St. Louis, MO	1964-1972
Research Associate, Department of Biology, Massachusetts Institute of Technology, Cambridge, MA	1961-1964
Guest Research Investigator, Istituto Superiore di Sanita, Rome, Italy	1960-1961
Part-time Assistant, Biological Effects of Irradiation Laboratory University of Michigan, Ann Arbor, MI	1953-1956

### HONORS:

Sophia Gomberg Fellowship in Chemistry	1955
National Institutes of Health Predoctoral Fellowship	1956-1960
National Foundation Postdoctoral Fellowship	1960-1961
ASM Foundation for Microbiology Lecturer	1989-1990
NIH MERIT AWARD	1988-1999
Fellow of the American Association for the Advancement of Science	1997

### NATIONAL AND INTERNATIONAL PROFESSIONAL ACTIVITIES:

Editorial Board, Journal of Virology	1975-1995
Member, Virology Study Section, N.I.H.	1975-1979
Member, Division of Cancer Biology and Diagnosis Board of Scientific Councilors, National Cancer Institute	1982-1986
Editor, Togaviridae and Flaviviridae, Plenum Press	1986
Section editor, ASM series Microbiology	1985
Grant Review Committee, Multiple Sclerosis Society	1986-1992
Chair of Committee, Multiple Sclerosis Society	1989-1992
Councilor, American Society for Virology (ASV)	1986-1989
Finance Committee, ASV Chair	1989-1991
Editorial Board, Virus Research	1985 - 2001
Advisory Council, Virology Division, IUMS	1990-1996
President-elect, American Society for Virology	1991-1992
President, American Society for Virology	1992-1993

Chair, Experimental Virology Study Section, NIH	1994-1996
Member Review Panel for Postdoctoral Fellowships, Howard Hughes Inst.	1994- 1997
Finance Committee, American Society for Virology	1994-
Chair of Committee	1998 -
American Society for Microbiology Committee on International Activities in Microbiology	1995- 2000
AAAS Electorate Nominating Committee, Section of Medical Sciences	1996 - 1999
ASM Committee on History of Microbiology	1998 – 2002
Chair-elect AAAS Medical Sciences Section	1999 - 2000
Chair - AAAS Medical Sciences Section	2000 - 2001
Past-Chair AAAS Medical Science Section	2001 - 2002
AAAS Program Committee for the National Meeting	2002 -

#### SOCIETY MEMBERSHIPS:

American Society for Biochemistry and Molecular Biology (FASEB)  
American Association for the Advancement of Science  
American Society of Microbiology  
American Society for Virology

#### PUBLICATIONS SINCE 1980 ONLY

- Weiss, B., Rosenthal, R. and Schlesinger, S. (1980). The establishment and maintenance of persistent infection by Sindbis virus in BHK cells. **J. Virol.** **33**: 463-474.
- Gibson, R., Kornfeld, S. and Schlesinger, S. (1980). A role of oligosaccharides in glycoprotein biosynthesis. **Trends in Biochemical Sciences.** **5**: 290-293.
- Schlesinger, S. (1980). Synthesis of Viral Proteins in **Cell Membranes and Viral Envelopes in Cell Membranes and Viral Envelopes** (H.A. Blough and J.M. Tiffany, eds.) Academic Press, London.
- Gibson, R. Kornfeld, S. and Schlesinger, S. The Effect of Oligosaccharide chains of different sizes on the maturation and physical properties of the G protein of vesicular stomatitis virus. **J. Biol. Chem.** **256**: 5456-462.
- Weiss, B. and Schlesinger, S. (1981) Defective interfering particles of Sindbis virus do not interfere with the homologous virus obtained from persistently infected BHK cells but do interfere with Semliki Forest virus. **J. Virol.** **37**: 840-844.
- Schlesinger, S. and Gibson, R. (1981). A Role for Oligosaccharides in the Synthesis of the G Protein of Vesicular Stomatitis Virus in Replication of Negative Strand Viruses, **Developments in Cell Biology** 7: Elsevier, North Holland
- Monroe, S.S., Ou, J-H., Rice, C.M., Schlesinger, S., Strauss, E.G. and Strauss, J.H. (1982). Sequence analysis of cDNA's derived from the RNA or Sindbis Virions and of Defective Interfering Particles. **J. Virol.** **41**: 153-162.
- Crimmins, D. and Schlesinger, S. (1982). Physical Properties of G Protein from Vesicular Stomatitis Virus Measured by Intrinsic Fluorescence and Aggregation. **Biochemistry** **21**: 3518-3524.
- Monroe, S.S. and Schlesinger, S. (1983). RNAs from two independently isolated defective interfering particles of Sindbis virus contain a cellular tRNA sequence at their 5' ends. **Proc. Natl. Acad. Sci. USA** **80**: 3279-3283.

- Crimmins, D.L., Mehard, W. B., and Schlesinger, S. (1983). Physical properties of a soluble form of the glycoprotein of vesicular stomatitis virus at neutral and acidic pH. **Biochemistry** **22**: 5790-5796.
- Weiss, B., Levis, R. and Schlesinger, S. (1983). Evolution of virus and defective interfering RNAs in BHK cells persistently infected with Sindbis virus. **J. Virol.** **48**: 676-684.
- Monroe, S.S., and Schlesinger, S. (1984). Common and distinct regions of defective interfering RNAs of Sindbis virus. **J. Virol.** **49**: 865-872.
- Schlesinger, S., Malfer, C. and Schlesinger, M.J. (1984). The formation of vesicular stomatitis virus (San Juan Strain) becomes temperature-sensitive when glucose residues are retained on the oligosaccharides of the the glycoprotein. **J. Biol. Chem.** **259**: 7597-7601.
- Tsiang, M., Monroe, S.S. and Schlesinger, S. (1985). Studies on defective-interfering RNAs of Sindbis virus with and without TRNA<sup>Asp</sup> sequences at their 5' terminus. **J. Virol.** **54**: 38-44.
- Schlesinger, S., Koyama, A.H., Malfer, C., Gee, S.L. and Schlesinger, M.J. (1985). The effects of inhibitors of glucosidase I on the formation of Sindbis virus. **Virus Research**, **2**: 139-149.
- Schlesinger, M.J. and Schlesinger, S. (1986). Formation and assembly of alphavirus glycoproteins. *in* **Togaviridae and Flaviviridae** (eds. S. Schlesinger and M.J. Schlesinger) Plenum Press.
- Schlesinger, S. and Weiss, B. (1986). Defective RNAs of alphaviruses *in* **Togaviridae and Flaviviridae** (eds. S. Schlesinger and M.J. Schlesinger), Plenum Press.
- Levis, R., Weiss, B.G., Tsiang, M., Huang, H. and Schlesinger, S. (1986). Deletion mapping of Sindbis virus DI RNAs derived from cDNAs defines the sequences essential for replication and packaging. **Cell** **44**: 137-145.
- Smith, M.M., Schlesinger, S. Linstrom, J. and Merlie, J.P. (1986). The effects of inhibiting oligosaccharide trimming by 1-deoxyrojinimycin on the nicotinic acetylcholine receptor. **J. Biol. Chem.** **261**: 14825-14832.
- Schlesinger, S., Levis, R., Weiss, B.G., Tsiang, M. and Huang H. (1987). Replication and packaging sequences in defective interfering RNAs of Sindbis virus. *in* Positive-strand viruses (eds. UCLA Symposia on Molecular & Cellular Biology New Series, Vol. 54, 1987. M. Brinton and R. Rueckert) in Alan Liss, NY.
- Schlesinger, M.J. and Schlesinger, S. (1987). Domains of virus glycoproteins. *in* **Advances in Virus Research**, **33**: 1-44.
- Levis, R., Huang, H., and Schlesinger, S. (1987). Engineered defective interfacing RNAs of Sindbis virus express bacterial chloramphenicol acetyltransferase in avian cells. **Proc. Natl. Acad. Sci.** **84**: 4811-4815.
- Schlesinger, S. (1988). The generation and amplification of DI RNAs. *in* **RNA Genetics**, Volume II, (eds. E. Domingo, J.J. Holland and P. Ahlquist) CRC Press.
- Tsiang, M., Weiss, B.G. and Schlesinger, S. (1988) The effects of 5' terminal modifications on the biological activity of DI RNAs of Sindbis virus. **J. Virol.** **62**: 47-53.

- Xiong, C., Levis, R., Shen, P., Schlesinger, S. Rice, C.M., and Huang, H.V. (1989). Sindbis virus: an efficient, broad host range vector for gene expression in animal cells. **Science** **243**: 1188-1191.
- Huang, H.V., Rice, C.V., Xiong, C., and Schlesinger, S. (1989). RNA viruses as gene expression vectors. **VIRUS GENES** **3**: 85-91.
- Weiss, B., Nitschko, H., Ghattas, I., Wright, R., and Schlesinger, S. (1989). Evidence for specificity in the encapsidation of Sindbis RNAs. **J. Virol.** **63**:5310-5318.
- Schlesinger, S., Weiss, B., and Nitschko, H. (1990). Sindbis RNAs bind the viral capsid protein specifically and are preferentially encapsidated *in* New aspects of positive-strand RNA Viruses. (eds. M.A. Brinton and F.X. Heinz) Am. Soc. Micro., Washington D.C.
- Sawicki, D.L., Barkhimer, D.B., Sawicki, S.G., Rice, C.M. and Schlesinger, S. (1990). Temperature sensitive shut-off of alphavirus minus strand RNA synthesis maps to a nonstructural protein nsP4. **Virology** **174**: 43-52.
- Levis, R., Schlesinger, S., and Huang, H. (1990). The Promoter for Sindbis virus RNA-dependent subgenomic RNA transcription. **J. Virol.** **64**: 1726-1733.
- Schlesinger, S. and Schlesinger, M.J. (1990) Replication of Togaviridae and Flaviviridae in **VIROLOGY** (eds. B.N. Fields and D.M. Knipe). Raven Press, N.Y.
- Grakoui, A., Levis, R., Raju, R., Schlesinger, S., Huang, H.V. and Rice, C.M. (1990). Cis-Acting Sequence responsible for Sindbis virus subgenomic RNA Synthesis in New aspects of positive-strand RNA Viruses. (eds. M.A. Brinton and F.X. Heinz) Am. Soc. Micro., Washington, D.C.
- Geigenmüller-Gnirke, U., Weiss, B., Wright, R. and Schlesinger, S. (1991). Complementation between Sindbis viral RNAs produces infectious particles with a bipartite genome. **Proc. Natl. Acad. Sci.** **88**: 3253-3257.
- Weiss, B.G. and Schlesinger, S. (1991). Recombination between Sindbis virus RNAs **J. Virol.** **65**: 4017-4025.
- Harrison, S.C., Schlesinger, S., Schlesinger, M.J. and Strong, R.K. (1992) Crystallization of Sindbis virus and its nucleocapsid. **J. Mol.Biol.** **226**: 277-280.
- Buzan, J. and Schlesinger S., (1992) Expression and biological activity of the nonstructural proteins of Sindbis virus in an *Autographa californica* vector. **Virus Research** **23**: 209-222.
- Geigenmüller-Gnirke, U., Nitschko, H. and Schlesinger, S. (1993) Deletion Analysis of the Capsid Protein of Sindbis Virus: Identification of the RNA Binding Region. **J. Virol.** **67**: 1620-1626.
- Schlesinger, S., (1993) Alphaviruses Vectors for the Expression of Heterologous Proteins. **Trends in Biotechnology** **11**: 18-22.
- Schlesinger, S., and Weiss, B.G. (1994) Recombination Between Sindbis Virus RNAs. **Arch Virol** [suppl] **9**: 213-220.
- Bredenbeek, P.J., Frolov, I. , Rice, C.R., and Schlesinger, S. (1993) Sindbis Virus Expression Vectors: Packaging of RNA Replicons by Using Defective Helper RNAs. **J. Virol.** **67**: 6439-6446

- Olivo, P., Frolov, I. and Schlesinger, S. (1994) A cell line that expresses a reporter gene in response to infection by Sindbis virus: A prototype for detection of positive strand RNA viruses. **Virology** 198: 381-384.
- Schlesinger, S., Makino, S and Linial, M.L. (1994) Cis-Acting genome elements and trans-acting proteins involved in the assembly of RNA viruses. **Seminars in Virology** 5: 39-49.
- Frolov, I. and Schlesinger, S. (1994) Comparison of the effects of Sindbis virus and Sindbis virus replicons on host cell protein synthesis and cytopathogenicity in BHK cells **J. Virol.** 68: 1721-1727.
- Weiss, B., Geigenmuller-Gnirke, U. and Schlesinger, S. (1994) Interactions between Sindbis virus RNAs and a 68 amino acid derivative of the viral capsid protein further define the capsid binding site. **Nucleic Acids Research** 22: 780-786.
- Schlesinger, S. (1994) Women Scientists in Vietnam. **AWIS Magazine** 23: 10,13.
- Schlesinger, S. (1995) RNA viruses as vectors for the expression of heterologous proteins. **Molecular Biotechnology** 3: 155-165.
- Schlesinger, S. and Schlesinger, M.J. Replication of Togaviridae in **FIELDS VIROLOGY**, third edition pp 825 - 841 (eds. B.N. Fields, D.M. Knipe and P.M. Howley et al.) Lipincott - Raven Press, Philadelphia
- Frolov, I. and Schlesinger, S. (1994) Translation of Sindbis virus mRNA: Effects of sequences downstream of the initiating codon. **J. Virol.** 68: 8111-8117.
- Herweijer, H., Latendresse, J.S., Williams, Ph., Zhang, G., Danko, I., Schlesinger, S. and Wolff, J. A. (1995) A Plasmid-Based Self-Amplifying Sindbis Virus Vector. **Human Gene Therapy** 6:1161-1167.
- Frolov, I. and Schlesinger, S. (1996) Translation of Sindbis virus mRNA: Analysis of sequences downstream of the initiating AUG codon that enhance translation. **J. Virol.** 70: 1182-1190.
- Frolov, I., Hoffman, T.A., Pra'gai, B.M., Dryga, S.A., Huang, H.V., Schlesinger, S. and Rice, C.M. (1996) Alphavirus-based expression vectors: strategies and applications. **Proc. Natl. Acad. Sci. USA** 93: 11371 - 11377.
- Frolova, E., Frolov, I. and Schlesinger, S. (1997) Packaging Signals in Alphaviruses. **J. Virol.** 71: 248-258.
- Dryga, S.A., Dryga, O.A. and Schlesinger, S. (1997) Identification of mutations in a Sindbis virus variant able to establish persistent infection in BHK cells: the importance of a mutation in the nsP2 gene. **Virology** 228: 74-83.
- Frolov, I., Frolova, E. and Schlesinger, S. (1997) Sindbis virus replicons and Sindbis virus: assembly of chimeras and of particles deficient in virus RNA. **J. Virol.** 71:2819-2829
- Schlesinger, S. (1997) Bernard N. Fields - a biographical memoir. in **Biographical Memoirs, 1997** The National Academy Press, Washington, D.C. in press.
- Agapov, E.V. Frolov, I., Lindenbach, B.D., Pragal, B.M., Schlesinger, S. and Rice, C.M. (1998) Noncytopathic Sindbis virus RNA vectors for heterologous gene expression.

**Proc. Natl. Acad. Sci. USA 95:** 12989-112994.

Olivo, P.D., Collins, P.L., Peeples, M.E. and Schlesinger, S. (1998) Detection and quantitation of human respiratory syncytial virus (RSV) using minigenome cDNA and a Sindbis virus replicon: a prototype assay for negative-strand RNA viruses. **Virology 251:** 198-205.

Ivanova, L., Schlesinger, S. and Olivo, P.D. (1999) Regulated expression of a Sindbis virus replicon by herpesvirus promoters. **J. Virol. 73:** 1998-2005.

Frolov, I., Agapov, E., Hoffman, T.A. jr., Pragai, B.M., Lipka, M., Schlesinger, S. and Rice, C.M. (1999) Selection of RNA replicons capable of persistent non-cytopathic replication in mammalian cells. **J. Virol. 73:** 3854-3865.

Polo JM, Belli BA, Driver DA, Frolov I, Sherrill S, Hariharan MJ, Townsend K, Perri S, Mento SJ, Jolly DJ, Chang SM, Schlesinger S, Dubensky TW, Jr. (1999) Stable alphavirus packaging cell lines for Sindbis virus and Semliki Forest virus-derived vectors. **Proc Natl Acad Sci USA 96:**4598-4603.

Ehrengruber MU, Lundstrom K, Schweitzer C, Heuss C, Schlesinger S, Gähwiler BH: (1999) Recombinant Semliki Forest virus and Sindbis virus efficiently infect neurons in hippocampal slice cultures. **Proc. Natl. Acad. Sci. USA 96:**. 7041-7046.

Schlesinger, S. (1999) Alphavirus expression systems -promises and problems. **ASM News 65:** 688-695.

Schlesinger, S and Dubensky, T.W. Jr. (1999) Alphavirus vectors for gene expression and vaccines, **Current Opinion in Biotechnology, 10:** 434-439.

Schlesinger, S. (2000) Alphavirus expression vectors in **Advances in Virus Research Academic Press 55:** 565-577.

Schlesinger, S. and Schlesinger, M.J. Replication of Togaviridae in **FIELDS VIROLOGY**, fourth edition Lipincott - Raven Press, Philadelphia in press.

Schlesinger S. (2001) Alphavirus vectors: development and potential therapeutic applications invited review for **Expert Opinion on Biological Therapy 1:** 177-191, 2001.

Schlesinger, MJ and Schlesinger, S. Togaviruses chapter in textbook edited by Nicholas Acheson in press

#### **Web publications:**

<http://medicine.wustl.edu/virology/>

#### **PATENTS**

Sindbis virus vectors: Patent number 5, 091,309 - with Henry V. Huang, Robin Levis, Barbara Weiss and Manuel Tsiang

Infectious Sindbis virus vectors: Patent number 5,2217,879 - with Henry V. Huang, Robin Levis, Charles M. Rice, Ping Shen and Cheng Xiong

Indicator Cell lines for detecting RNA viruses: Patent number 5,591,579 - with Paul Olivo

Recombinant alphavirus-based vectors with reduced inhibition of cellular macromolecular synthesis:  
with Thomas W. Dubensky Jr., John M. Polo, Barbara A. Belli, Sergey A. Dryga and Ilya  
Frolov - patent pending

Silent inducible virus replicons and uses thereof: issued - with Paul Olivo

Detection of negative-strand RNA viruses - patent issued - with Paul Olivo, Mark Peebles and Peter  
Collins

### **History of virology: research and publications**

I am currently working on a project originally supported by a grant from the Sloan Foundation. This grant was part of the Sloan Foundation Program on the Recent History of Science and Engineering on the Web. This Program was set up to explore the possibility that the Web could be used in an innovative way to obtain an historical record from contributors to the field by having them record their memories on the Web. The project that I am working on is "Viruses from Structure to Biology". The goal of this Web site is to explore the historical developments that led to the determination of the structure and biological functions of viruses and their macromolecular components. I am attempting to investigate the history of how knowledge of the structure of viruses at atomic resolution has impinged on the more biological studies of viruses. I have interviewed and carried out extensive oral histories with several of the scientists who have contributed to the determination of structure.

The Web site address is: <http://medicine.wustl.edu/virology/>

I have completed three oral histories that are now available at the Chemical Heritage Foundation, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106. These are with:

Dr. Boris Magasanik, Professor of Biology, Massachusetts Institute of Technology

Dr. Bernard N. Fields (now deceased) had been Professor and Chairman, Department of Microbiology and Molecular Genetics, Harvard Medical School

Dr. David Baltimore, President of the California Institute of Technology and Nobel Prize winner. In conjunction with my interviews with David Baltimore I also interviewed several of the scientists who worked with him during the early days of the discovery of reverse transcriptase - the work that led to his being awarded the Nobel Prize. These interviews will also be part of the Chemical Heritage documents.

I have interviewed several of the scientists at the Centers for Disease Control who have been involved in the Program for the Eradication of poliovirus. Some of this was incorporated into a symposium that I organized for the meeting of the American Association for the Advancement of Science in 2000. the symposium was entitled. "Eradication of a Virus: Lessons learned from polio". I gave the introductory historical overview for this symposium.

### **Ethics**

From 1997 until 2000 I taught and helped organize a course entitled Ethics and Research Science. This course was given for the graduate students in the Division of Biology and Biomedical Sciences. For two years I was one of two Co-chairs who were responsible for the organization and implementation of the course.

For the past three years I have been the Faculty Advisor for a seminar series "Science and Society". This is a series that was started by me and a graduate student to introduce topics to the biomedical community

that would be of more general interest and concern. We felt that it was important that scientists and physicians be aware of these issues and also have up-to-date information about what is known. We organized lectures and discussions by visiting scholars or members of the Washington University community on subjects such as: biowarfare, xenotransplantation, false memories, genetically engineered foods and problems of the advancement of women in science.

For the past two years I have been involved in trying to establish a **Center for the Study of Human Values** at Washington University. Our goal is to establish a center of ethics that will include the entire Washington University campus. For most of this period I had been one of only three Faculty members on the working committee. Although only three of us have been doing much of the work, the Chancellor and Deans as well as many of the Faculty, especially members of the Philosophy Department have expressed great interest and support for this type of Center. Although the Center has not yet been established there is now a larger planning committee with funds provided by the Chancellor for taking the steps necessary to set up the Center.